REMARKS

In the Office Action dated January 8, 2003, claims 1-20 are pending. Claims 1, 4, 8, 10-11, and 16 have been amended. Note that claim 1, 11, and 16 are independent claims from which claims 2-10, 12-15, and 17-20 depend, respectively, therefrom.

The Declaration is objected to because words and dates on the right hand side of the declaration have been cut off. A resubmitted Oath/Declaration accompanies this response.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because Figure 3 includes a reference sign 84, which is not included in the specification. Figure 3 has been amended, replacing sign 84 with 22, which is included in the specification.

In the specification, the information related to the cross-reference of the specification on page one has been amended to include the serial number and filing date, as suggested in the Office Action.

The disclosure is objected to because of informality reasons. Paragraphs [0022] and [0026] have been amended to change tubular portion 24 to tubular portion 28 and 52 to 58, respectively, as suggested in the Office Action.

In paragraph 5 of the Office Action, it is suggested that the trademark Teflon be capitalized and be accompanied by the generic terminology. Paragraph [0028] has been amended to include the following generic terminology, "thread-seal tape" in accompaniment of the trademark Teflon. This is the only use of the trademark in the entire application.

Claims 1-15 are objected to because of informality reasons. Claim 1 has been amended, such that the word "that" is now "than." The word "a" has been removed from the phrase "generating a an output" in claim 4. Claim 8 now depends from claim 7 rather than claim 1, so that there is proper antecedent basis for "said gain adjustment circuit." Claim 10 now depends

from claim 4 rather than claim 1 so that there is now proper antecedent basis for "said control circuit." Claim 11 has also been amended so that there is proper antecedent basis for "said second outer diameter", such that the phrase "a second annular" is followed by the term "electrode", and the word "first" is removed from the phrase "a second first inner diameter."

Applicants submit that the drawings, the specification, and claims 1-15, in light of the above-stated amendments, are now in a condition for allowance with at least in respect to the claimed objections.

Claims 1 and 16 stand rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (USPN 5,931,802). Applicants respectfully traverses these rejections and requests the Examiner to reconsider claims 1 and 16 in light of the enclosed amendments and comments below. Claims 1 and 16 have similar limitations and will therefore be discussed together.

Claims 1 and 16 are directed towards a conductivity sensor and method of assembling the same. The conductivity sensor includes a first annular electrode that has a first inner diameter and a second annular electrode that has an inner diameter that is equal to the first inner diameter. A tubular portion is disposed axially between the first electrode and the second electrode. The tubular portion defines a sensor cell with the first annular electrode and the second annular electrode. The cell has a second inner diameter that is greater than the first inner diameter and a cell length between the first electrode and the second electrode.

Yoshida is directed towards an extracorporeal blood circulator having a conductivity meter. The conductivity meter includes an insulating plastic member that is coupled to a pair of electrodes therebetween. According to Figure 1B, the plastic member has two inner diameters; a first inner diameter coincides with an outer diameter of the electrodes and a second inner diameter coincides with diameter of an area between the electrodes. The diameter of the area between the electrodes is of concern and is less than inner diameter of the electrodes, unlike the present invention.

The sensor cell of the present invention has a desired cell constant due to inner diameters of the electrodes, diameter of the sensor cell, and the arrangement of the electrodes in relation to the tubular portion. The present invention has desired performance characteristics due to the stated cell constant, which is different than that of Yoshida, as stated in paragraph 10 of the Office Action. Thus, Yoshida does not teach or suggest each and every element of claims 1 and 16.

Claim 11 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. in view of Jeter (USPN 3,866,678). Claim 11 is similar to claims 1 and 16 and has been amended to include the limitation of a sensor cell having an inner diameter that is greater than inner diameters of a fist annular electrode and of a second annular electrode.

Jeter is directed towards an apparatus for conducting electrical energy. Jeter teaches steel pipe having threaded joints. Jeter does not teach or suggest a first annular electrode having a first threaded portion or a second annular electrode having a second threaded portion. Jeter simply teaches coupling and sealing of two threaded steel pipes within a joint. Jeter, like Yoshida, also does not teach or suggest a sensor cell having an inner diameter that is greater than inner diameter of a first annular electrode and of a second annular electrode.

Referring to MPEP 2141.01(a) states, "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Jeter is nonanalogous art in relation to the present invention. Jeter is not in the same U.S. class or field of endeavor as that of the present invention. A person of ordinary skill in the art of conductivity sensors would not reasonably have considered a reference dealing with an apparatus for conducting electrical energy. Besides, the court has found "the similarities and differences in

structure and function of the invention to carry far greater weight." In re Ellis, 476 F.2d 1370, 1372, 177USPQ526, 527 (CCPA1973). Thus, it would not have been obvious to one skilled in the art to use Jeter's invention in combination with Yoshida's invention to discover the present invention.

Moreover to establish a *prima facie* case of obviousness, three basic criteria must be met, under MPEP 2142. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the second reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references when combined must teach or suggest all the claim limitations.

There is no suggestion in either Jeter or Yoshida to combine the teachings of each reference, let alone whether the combination thereof would render the present invention obvious. For example, neither Jeter nor Yoshida teach or suggest a first annular electrode and a second annular electrode, which are both threaded and coupled to a tubular portion. Only Yoshida includes a first annular electrode and a second annular electrode, which are not threaded or in the above-stated relationship with the tubular portion. Also, the Examiner has not provided any objective reason to combine the stated references.

Claim 11 is therefore novel and nonobvious for the above state reasons.

Yoshida and Jeter do not teach or suggest alone or in combination a conductivity sensor having a sensor cell defined by a first annular electrode, a second annular electrode, and a tubular portion and having an inner diameter that is greater than inner diameter of the electrodes. Therefore, claim 1, 11, and 16 are novel and nonobvious and are in a condition for allowance. Also, since claims 2-10, 12-15, and 17-20 depend from claims 1, 11, and 16, respectively; they are also novel and nonobvious for at least the same reasons.

In light of the amendments and remarks, Applicants submit that all objections and rejections are now overcome. The Applicants have added no new matter to the application by these amendments. The application is now in condition for allowance and expeditious notice thereof is earnestly solicited. Should the Examiner have any questions or comments, he is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

In the Specification:

Kindly substitute the paragraph titled "Cross Reference to Related Applications" with the following:

The present invention is related to application (Attorney Docket 201-0891) entitled "Control Circuit for Operating a Conductivity Sensor and Method Therefor", having U.S. Serial Application No. 09/682,740, filed simultaneously herewith on October 12, 2001, and incorporated by reference herein.

Kindly substitute the following for paragraph [0022]:

[0022] First annular electrode 24 and second annular electrode 26 may be coupled to tubular portion 28 in an interference fit. However, a threaded portion 30, 32 on respective first annular electrode 24 and second annular electrode 26 may be included. Threaded portions 30, 32 correspond with threaded portions 34, 36 on the inside diameter of tubular portion 28[4]. To ease assembly, the first annular electrode 24 and second annular electrode 26 may be screwed into tubular portion 28.

Kindly substitute the following for paragraph [0026]:

[0026] To further increase the reliability of the system, a seal material may be positioned between first annular electrode 24 and tubular portion 28 and between second annular electrode 26 and tubular portion 28. One type of suitable material is a thread-seal tape, such as Teflon tape, which may be positioned on threaded portions 30, 32, 34, and 36. Because the cell constant is well defined, a known resistor used within the calibration circuit as will be further described below, may be used to calibrate the system.

Kindly substitute the following for paragraph [0028]:

[0028] Square wave generator circuit 40 may, for example, produce a square wave of about 300 Hz. Although various types of square wave generating circuits may be used, an operational amplifier-based circuit is illustrated. Square wave generator circuit 40 has an operational amplifier U_1 having an inverting input 52, a non-inverting input 54, and an output 56. A capacitor C_1, which in this case is 0.015μF is coupled to inverting input 52. A resistor R_1 is coupled between inverting input 52 and output 56. Output 56 is coupled to ground through a first resistor R_2 and R_3. The node between R_2 and R_3 is common node N_2. Common node N_2 is coupled to non-inverting input 54. The common node at output 56 is coupled to synchronous detection circuit through resistor R_4. Each of the resistors R_1, R_2, R_3 and R_4 in this example is 100kΩ. Buffer circuit is also formed of an operational amplifier U_2. Operational amplifier U_2 has an inverting input 58[2], a non-inverting input 60, and an output 62. Output 62 is coupled to first annular electrode 24, which in turn is coupled to inverting input 58. Node N_1 is coupled to ground through three resistors R_5, R_6 and R_7. In the present example, R_5 is 68kΩ and R_7 is 2.2kΩ. R_6 is a 5 kΩ potentiometer having an adjustable terminal 64 coupled to non-inverting input 60. As will be further described below, the conductivity gain adjustment may be provided through adjustment of the adjusting terminal 64 of resistor R_6.

In the claims:

Kindly substitute the following for pending claim 1:

1. (Amended) A conductivity sensor comprising:

a first annular electrode having a first inner diameter;

a second annular electrode having the first inner diameter; and

a tubular portion disposed axially between said first electrode and said second electrode, said tubular portion defining a sensor cell with said first annular electrode and said second annular electrode;

said cell having a second inner diameter that is greater than[t] said first inner diameter and[,

said tubular portion, said first electrode and said second electrode defining a sensor cell, said cell having] a cell length between said first electrode and said second electrode.

Kindly substitute the following for pending claim 4:

4. (Amended) A conductivity sensor as recited in claim 1 further comprising a control circuit generating [a] an output corresponding to a conductivity of a fluid between said first annular electrode and said second annular electrode.

Kindly substitute the following for pending claim 8:

8. (Amended) A conductivity sensor as recited in claim 7[1] wherein said gain adjustment circuit is coupled to said first electrode.

Kindly substitute the following for pending claim 10:

10. (Amended) A conductivity sensor as recited in claim 4[1] wherein said control circuit is an operational amplifier-based.

Kindly substitute the following for pending claim 11:

11. (Amended) A conductivity sensor comprising:

a first annular electrode having a first inner diameter and a first outer diameter, said first annular electrode having a first threaded portion said first outer diameter;

a second annular electrode having a second [first] inner diameter and a[the] second outer diameter, said second annular electrode having a second threaded portion said second outer diameter; and

a tubular portion disposed axially between said first electrode and said second electrode, said tubular portion having a third inner diameter greater than[t] said first inner diameter and said second inner diameter,

said tubular portion, said first electrode and said second electrode defining a sensor cell having said third inner diameter, said cell having a cell length between said first electrode and said second electrode.

Kindly substitute the following for pending claim 16:

16. (Amended) A method of assembling a conductivity sensor comprising:

coupling a first annular electrode having a first inner diameter to a tubular portion;

coupling a second annular electrode having the first inner diameter to the tubular portion so that the tubular portion is positioned axially between said first electrode and said second electrode,

defining a sensor cell having a second inner diameter that is greater than said first inner diameter with said first annular electrode, said second annular electrode, and said tubular portion.